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Abyssal Bryozoa Collected by Expeditions of the Lamont Geological Observatory 1. Bicellariellidae (Bugulidae of Authors), *Kinetoskias*

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INTRODUCTION

Our knowledge regarding the abyssal species of Bryozoa is exceedingly sparse. The number of species known in the world from 3000 meters and below is fewer than 60 (Silén, 1951). These are all cheilostomatous species. The expedition literature is highly misleading. Titles suggest broad coverage of the seas, which is far from the actual case. Busk (1884) in the famous Challenger expedition report recorded 295 species, only 52 of which were from 1000 fathoms and greater depths. Kluge (1914) recorded only eight species from below a depth of 2000 meters out of the 84 mentioned in the results of the German Antarctic expedition. Hasenbank (1932) cited 45 species from the German deep sea expedition of the "Valdivia"; none was from below 2000 meters. Silén (1951) described only three abyssal species from the Swedish deep sea expedition of the "Albatross."

To date at least 20 species of truly abyssal species of cheilostomatous Bryozoa have been identified by the writer from the deep sea collections made from the R. V. "Vema." Less than one-half of the "Vema" collec-

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tions have been sorted, and the number of abyssal species is expected to increase accordingly as the collections become known.

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In the present paper the abyssal species (those from 2000 meters or more depth) belonging to the genus *Kinetoskias* from the abyssal Atlantic are described. The types on which the new species are based have been deposited in the collections of the American Museum of Natural History.

Range

The genus is widely distributed throughout the world. It has not yet been recorded from the Indian Ocean, Antarctic continent, or from the Mediterranean or Caribbean seas. The majority of the records are from the Arctic Ocean (Kluge, 1953). West African records for the genus are given here for the first time.

The bathymetric range of the genus is very wide. Species have been recorded from depths as shallow as 30 meters and as great as 4670 meters. On "Vema"-12 Cruise *K. pocillum* was collected from a depth of 3049 meters from the South Atlantic. Possibly only five species of Bryozoa are known from greater depths (Silén, 1951). The bathymetric distribution of the nine known species is given in table 1.

Geologic History

The family to which *Kinetoskias* belongs has entirely a Recent geologic history (Bassler, 1953), which suggests that penetration of the abyss by *Kinetoskias* might have occurred in recent geologic times, although negative evidence is here of only limited value.

Origin

Kluge (1953), on the basis of his study on the branching of the zooarium, concluded that the species of this genus have originated from shallow-water Arctic species. Clearly, the genus has been recorded mostly from Arctic and near-Arctic localities and from temperatures in the abyss nearly equivalent to polar surface temperatures.

TABLE 1
BATHYMETRIC DISTRIBUTION OF THE NINE SPECIES OF *Kinetoskias*

Species	Meters (Mostly from Kluge, 1953)	Lamont Vessels
smitti	100–690	Not collected
pocillum	57–3852	3049, 2970
arborescens	30–1229	Not collected
cyathus	2475–4670	Not collected
elongata	798–2798	Not collected
mitsukurii	145–3400	Not collected
beringi	3400–3800	Not collected
vemae	4047	4047
elegans	708–1861	708, 1861

SYSTEMATICS

GENUS *KINETOSKIAS* DANIELSSEN

SYNONYMS: *Bugula* (in part) of several authors; *Naresia* Wyville Thompson.

TYPE SPECIES: *Kinetoskias smitti* (Sars).

Kinetoskias pocillum Busk, 1881

Figure 1B

Kinetoskias pocillum BUSK, 1881, p. 7, pl. 1, figs. 2, 5.

DIAGNOSIS: *Kinetoskias* with outer frontal margins of zooecia rounded, free lateral margin slightly concave, inner margin markedly convex. Avicularia slightly longer than wide, attached to zooecium at lateral free margin slightly in front of mid-point. Step-like process lacking.

MEASUREMENTS: Zooecium, length, 0.73 mm., width, 0.30 mm.; operculum, width, 0.15 mm.

REMARKS: The specimens collected by the R. V. "Vema" agree in detail with the description and illustrations given by Busk (1884, p. 45, pl. 8, fig. 2), and therefore it is probable that the same species is represented in each case. Because the "Challenger" material came from two stations, one from 32–400 fathoms, and the other from 2160 fathoms, it is possible that Busk mixed up one or more species; however, his description does not so suggest.

DISTRIBUTION: South Atlantic and South Pacific oceans. 1. "Challenger" Station 122, latitude 09° 05′ to 10° S., longitude 34° 49′ to 53′

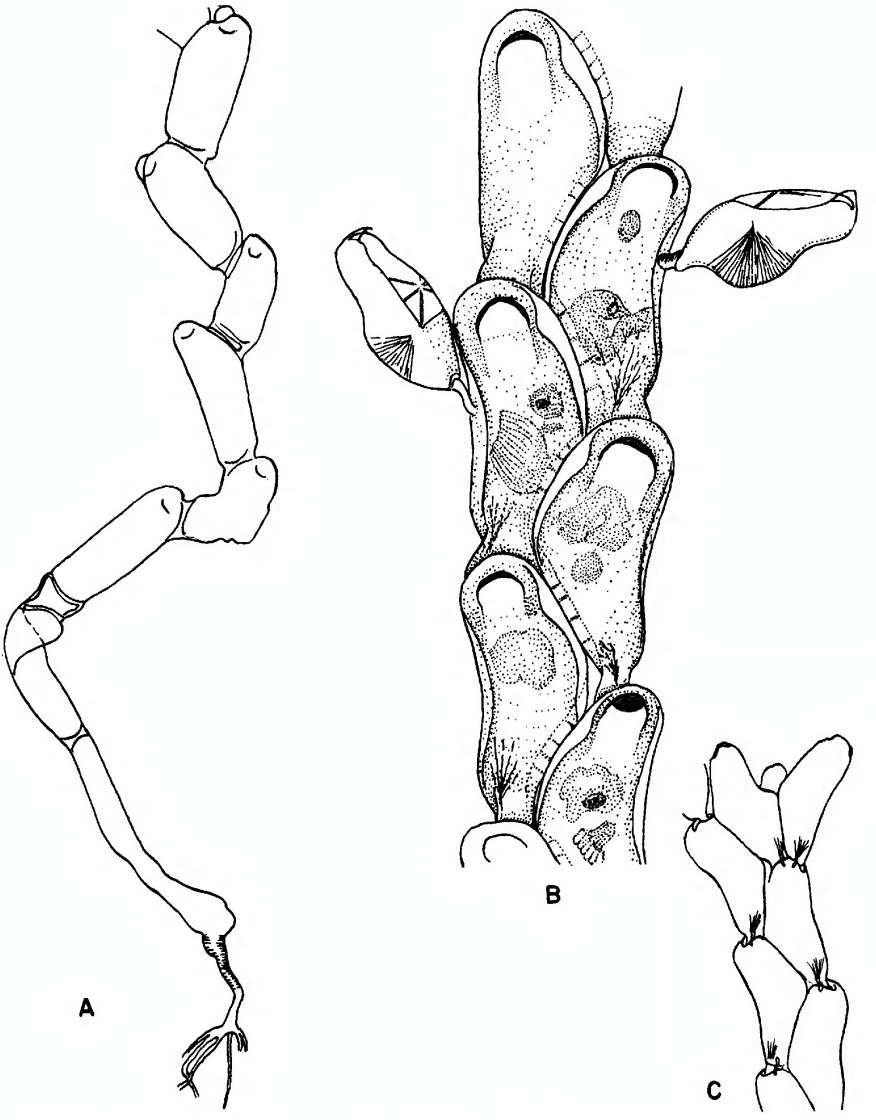

FIG. 1. A. *Kinetoskias elegans*, new species. B, C. *Kinetoskias pocillum* (Busk).

W., 32–400 fathoms (Busk, 1884, p. 45), off Brazil. 2. "Challenger" Station 299, latitude 33° 31′ S., longitude 74° 43′ W., 2160 fathoms, blue mud (Busk, *loc. cit.*), off Chile, Pacific Ocean. 3. "Vema"-12, L.G.O. Biol. No. 14, latitude 30° 14.9′ S., longitude 13° 03′ E., 1703

fathoms (3049 meters), foraminiferal ooze, bottom temperature 2.43° C., dissolved oxygen 4.8 milliliter per liter, off South Africa, one fragment, cat. no. B-1, slide 2. 4. "Vema"-12, L.G.O. Biol. No. 16, latitude 25° 33′ S., longitude 12° 27′ E., 1593 fathoms (2970 meters), white clay, off South Africa, eight fragments, cat. no. B-1, slides 2-3.

Kinetoskias vemae, new species

Figures 1A, 2A

DIAGNOSIS: *Kinetoskias* with outer frontal margins rounded, free lateral margin straight, inner margin angulate, curved or straight. Avicularium about twice as long as wide, attached to zooecium just caudad of aperture. Step-like process lacking. Zooecia about three times as long as wide.

MEASUREMENTS: Zooecium, length, 1.08 mm., width, 0.32 mm.; operculum, width, 0.29 mm.; avicularium, length, 0.34 mm., width, 0.19 mm.

REMARKS: This species can be distinguished at once by the distal location of the avicularium, its long zooecia, and by the shape of the avicularia. The colony attaches to the ooze by means of root-like processes. A hyaline peduncle is lacking.

DISTRIBUTION: South Atlantic Ocean. "Vema"-12, L.G.O. No. 18, latitude 23° 00′ S., longitude 08° 11′ E., 2162 fathoms (4047 meters), bottom temperature 1.35° C., off Walvis Bay, Union of South Africa, one specimen, cat. no. B–3, slide 7.

Kinetoskias elegans, new species

Figure 2B, C

DIAGNOSIS: *Kinetoskias* with outer frontal margins rounded, free lateral margin straight, inner margin convex. Avicularia as wide as long, attached to zooecium at lateral free margin at mid-point. Step-like process lacking.

MEASUREMENTS: Zooecium, length, 1.08 mm., width, 0.31 mm.; operculum, width, 0.16 mm.; avicularium, length, 0.24 mm., width, 0.25 mm.

REMARKS: In general aspects this species resembles *Kinetoskias pocillum* Busk; however, the zooecia are longer in this species. The avicularia are as long as wide instead of being longer than wide, and the immovable jaw of the avicularium is sharply pointed rather than blunt. The base of the zooarium is a simple, small, swollen bulb with a root-like process.

DISTRIBUTION: South Atlantic Ocean. 1. "Vema"-14, L.G.O. Biol. No. 54, latitude 34° 35′ S., longitude 17° 31′ E., 980 fathoms (1861

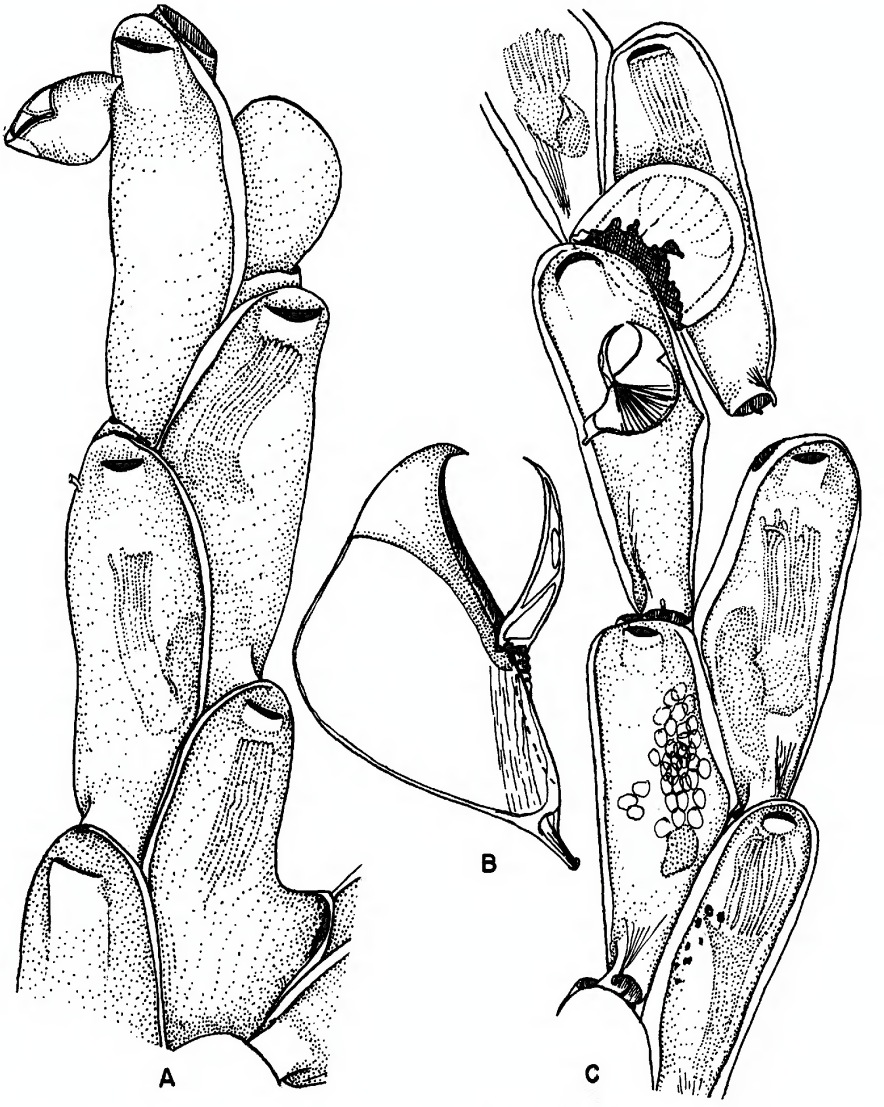

FIG. 2. A. *Kinetoskias vemae*, new species. B, C. *Kinetoskias elegans*, new species.

meters), type locality, three fragments, cat. no. B–2, slide 4. 2. "Vema"-14, L.G.O. Biol. No. 55, latitude 34° 26′ S., longitude 17° 32′ E., 380 fathoms (708 meters), six fragments, cat. no. B–2, slides 5-6.

The species that belong to *Kinetoskias* can be divided into two groups: group A, *cyathus*, *smitti*, and *elongatus;* group B, *pocillum*, *mitsukurii*, *ar-*

borescens, *beringi*, *vemae*, and *elegans*. Those in group A have a spine-like process at the outer distal margin of each zooecium. Those in group B lack a spine-like process at the outer distal margin of each zooecium. Four species (*cyathus*, *arborescens*, *mitsukurii*, and presumably also *beringi*) have the avicularia attached to a step-like process at the zooecial margin. Kluge (1953) did not describe the details of the zooecium of *K. beringi;* therefore inferences as to its detail have been drawn from his statement that the avicularia were similar to those of *mitsukurii*.

Additionally one may divide the species further into three groups based on the position of the avicularium on the zooecium. Three species (*elongatus*, *arborescens*, and *vemae*) have the avicularium located cephalad of the mid-point of the zooecium. Two species (*pocillum* and *elegans*) have the avicularium located at the mid-point. The remaining four (*smitti*, *cyathus*, *mitsukurii*, and *beringi*) have the avicularium located caudad to the mid-point of the zooecium.

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